Citation:

Woo J, Ho SC, Sham A. Longitudinal changes in body mass index and body composition over three years and relationship to health outcomes in Hong Kong Chinese age 70 and older. *J Am Geriatric Soc.* 2001; 49: 737-746.

PubMed ID: 11454112

Study Design:

Prospective cohort study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To determine the longitudinal changes in anthropometric measures and the relationship between these measures and mortality, morbidity, functional capacity, physical performance measurement, self-perceived health and psychosocial measures.

Inclusion Criteria:

- Hong Kong Chinese, age 70 years or older
- Participation in the Old Age Allowance Scheme or the Disability Allowance List.

Exclusion Criteria:

No information was made available on exclusion criteria.

Description of Study Protocol:

Recruitment

Subjects were recruited territory-wide by proportional random sampling. The source used was the non-means-tested Old Age Allowance Scheme, which covers over 90% of the older Hong Kong population. A stratified disproportional random sampling was used, with 300 subjects for each of four strata (males, 70 to 79; males, 80 and older; females, 70 to 79; and females 80 and older) and 150 subjects for each of six strata (males, 80 to 84; 85 to 90; and 90 and older; and females, 80 to 84; 85 to 89; and 90 and older).

Design

Longitudinal study.

Statistical Analysis

- Student's T-test was used to examine significant differences in mean values at baseline for subjects of the same sex with and without disease and corresponding mean changes with time
- Univariate logistic regression was used to examine the association between individual anthropometric measures and various three-year outcomes.

Data Collection Summary:

Timing of Measurements

Measurements were taken at baseline and 36 months through interviews conducted at the subjects' place of residence. Subjects were contacted at 18 months, when address and phone numbers were updated.

Dependent Variables

- Anthropometric measures as measured by height, weight, and BMI
- Body composition as measured by arm circumference, biceps and triceps skinfold thickness, arm muscle circumference, corrected arm muscle circumference, waist circumference and hip circumference
- Mortality
- Morbidity as measured by self-reporting of disease and medications taken
- Functional capacity as measured by time taken for a 16-foot walk and the Barthel Index
- Depression measured by the short version of the Geriatric Depression Score.

Independent Variables

Age.

Description of Actual Data Sample:

- *Initial N:* 2,032 (999 males, 1,033 females)
- *Attrition (final N):* After 356 months, 519 subjects had died and 342 were lost to follow-up, leaving 1,171 subjects for measurement of health outcomes other than mortality
- *Age:* All subjects were at least 70 years old. Subjects were stratified according to age and gender, with groups being 70 to 79 years old, and 80 to years old. The 80- to 89-year group was broken into strata by age and gender as follows: 80 to 84, 85 to 89, and 90 and older.
- *Ethnicity:* Ethnicity was not specifically stated but it can be assumed all were Chinese based on the study location
- *Other relevant demographics:* Very little demographic information was provided. For example, no information was provided on educational status, economic status or literacy level of subjects
- *Anthropometrics:* Baseline characteristics were similar for all groups with one exception. Those women lost to follow-up had a higher corrected arm muscle area than those who were re-interviewed.
- *Location:* Hong Kong, China.

Summary of Results:

- Over 36 months, 18.8 percent of all men and 20.9 percent of all women lost five or more kilograms
- All parameters, with the exception of triceps skin-fold in men, decreased, regardless of presence or absence of disease
- The decrease in arm circumference, triceps skinfold thickness, and total body fat was greater in women than in men, whereas men had a greater decrease in fat-free mass
- Even in the absence of disease, three times as many subjects lost more than 5.0kg in weight as gained more than 5.0kg (15% vs. 5%), and only age could be identified as a contributing factor to this weight loss
- In the absence of disease, lower anthropometric indices were associated with greater mortality, development of new disease (in women only), dependency and poor performance measure
- Waist-to-hip ratio was not associated with mortality or any other health outcomes
- Decrease in both fat-free mass and total body fat were associated with worse outcomes, the effect being more marked in women
- None of the anthropometric indices were associated with self-perceived health or depression score at three years
- Greater age and lower anthropometric indices (with the exception of waist-to-hip ratio) were associated with increased mortality in all subjects
- In men, increased mortality was associated with lower weight, BMI, arm circumference, triceps skin-fold thickness, TBR and BMR
- In women, greater age was also associated with increased mortality
- Increasing age was associated with dependency for all groups.

Author Conclusion:

In the older Chinese population, changes in weight and body composition occur even in the absence of disease. These changes are associated with mortality and physical functioning level. Loss of fat-free mass and total body fat is associated with mortality and disability. Increasing age was associated with increasing dependency for all groups. Weight loss is more important in this population than weight gain, and promotion of lifestyle interventions targeted at weight maintenance would be important.

Reviewer Comments:

Large sample size, representative of Hong Kong elderly. Authors note the following limitations:

- *Large-scale survey, body composition was calculated using prediction equations derived from Caucasian population*
- *Presence of disease based on self-report, not physicians' examination.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	No
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	No
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	No

3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	Yes
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A

6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	N/A
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	???
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	N/A
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	No
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes

	9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**		Yes
	10.1.	Were sources of funding and investigators' affiliations described?	No
	10.2.	Was the study free from apparent conflict of interest?	Yes